

PART A. INTRODUCTION

As part of a process intended to protect and improve the quality of the Nation's rivers, streams, and lakes, the federal Clean Water Act (CWA) requires ongoing water quality assessment and reporting programs for each State. While the United States Environmental Protection Agency (EPA) is responsible for the overall administration of the CWA, the Act "recognizes, preserves, and protects," a State's responsibility for water quality protection and planning.

The CWA Sections 303(d) and 305(b) require each State submit a biennial report to the United States Congress through the EPA. Specifically, under section 303(d), States are required to:

- ☐ Identify waterbodies that are water quality limited;
- ☐ Prioritize and target those waterbodies that are water quality limited;
- ☐ Determine the Total Maximum Daily Load (TMDL) allowable to meet water quality standards.

The resulting section 303(d) list provides the basis for systematically tracking State waters that do not meet State water quality standards. The approach states use to develop the 303(d) list accounts for nonpoint and point sources of pollution, and naturally occurring background levels in a watershed.

Under CWA, Section 305(b), States must provide:

- ☐ An assessment on the overall water quality of the State;
- ☐ An analysis of the extent to which State waters protect their designated uses (e.g., aquatic life and recreation in and on the water);
- ☐ A report on water pollution control programs;
- ☐ A description of ground and drinking water programs.

States have submitted these reports to EPA as separate documents until 2002 when the EPA provided guidance to states for integration into the 303(d) and 305(b) reports into a single Integrated Report. This report satisfies the reporting requirements for the 2004-2006 reporting cycle.

A.1 Clean Water Act Reporting in Montana***Data Management Systems: 1980s to 2006***

From the mid-1980s to 1996 water quality reporting and data management was delegated to the Montana Department of Health and Environmental Sciences (DHES). The 1997 Montana Legislature re-organized state government structure. As a result of this reorganization, the environmental science programs of DHES, which included water quality reporting and data management, were moved to a new Department of Environmental Quality (DEQ).

Montana's Water Quality program in the mid-1980s used the Environmental Protection Agency's (EPA) Waterbody System (WBS) for tracking water quality assessment information. The WBS application was maintained as an annually updated DOS-based computer system, which used hand recorded information on a hardcopy WBS data input forms for data entry. This data entry form provided the sole record of background or supporting information regarding decisions for the state's 303(d) lists from 1990 to 1998. The WBS application was enhanced prior to 1998 to a relational database management system built in FoxPro v. 2.6. Although the core data management system used by the Water Quality program was now in a more robust relational database, the program still relied on the limited data entry form for recording and documenting water quality assessments and 303(d) listing decisions.

After the 1998 303(d)/305(b) reporting cycle, the EPA released a new water quality data management application referred to as the Assessment Data Base (ADB). The ADB was developed in both Microsoft Access and Oracle platforms and DEQ's Water Quality program selected to implement the MS Access platform version. The program migrated its water quality assessment data into the new application and

used the ADB version 1.4 for its 2000, 2002, and 2004 303(d) list submittals to EPA. Simultaneously, the 1997 Montana legislature passed amendments to the state's water quality act requiring the DEQ to develop and implement a data management system that would document and demonstrate that it had "sufficient and credible" data to support water quality standards attainment decisions and 303(d) listing of impaired waters. The legislative amendments also required the DEQ to "develop and maintain a data management system that can be used to assess the validity and reliability of the data used in the listing and priority ranking process" (MCA 75-5-702(5)).

Pursuant to this new legislation the Water Quality program developed a data review system using spreadsheets. These assessment record sheets (ARS) document each waterbody assessment. The program currently manages 1,102 individual ARS spreadsheet files and associated hard copy assessment files. These files represent the official assessment record from which water quality standards attainment decisions are then also entered into the ADB system for reporting to EPA. The program has used this system for the 2000 to 2006 reporting cycles. The one change that occurred at the beginning of the current 2006 Integrated Report cycle was the program migrated its version of the ADB to a newer version (i.e., 1.4 to 2.2).

Migrating to the newer database resulted in some modifications to the state's impairment listings as broader listing causes, such as nutrients or metals, were no longer used. Rather these cause listings were replaced by more refined specific nutrient "species" or metals, such as ammonia or cadmium. As a result, the list of impairment causes expanded from 51 total causes comprised of 21 major categories and 19 sub-categories in version 1.4 to 494 total cause listings that can be filtered by 25 broad categorical groups for selecting purposes in version 2.2. The list of sources expanded from 101 total sources in 34 major categories with 54 second tier and 11 third tier sub-listings in version 1.4 to 183 total source listings organized into 26 broad categorical groups in version 2.2.

The other significant change in the new ADB data structure was the enforced linkage between a beneficial use and its associated impairment cause and probable source. While this requirement of the new system added beneficial information to the impairment decision record, it impacted the design of the ARS files and also the overall size of the printed 303(d) list. All ARS files had to be modified to incorporate the new cause and source listing codes and to capture the linkages between the beneficial use and impairment causes and sources.

Data Management Issues for the 2006 Integrated Report

As mentioned, DEQ used ADB version 2.2 for the 2006 reporting cycle. Thus, data from the previous version of the ADB needed to be moved into the new database version. This was done via a migration and "porting" project conducted in December 2004 with the assistance of EPA. All existing impairment causes and sources were mapped to their equivalent listing in the ADB v. 2.2. Listings without obvious translations were migrated by program staff after a review of historical listing data and information in the ARS files. To ensure tracking of potential impairments previously identified, waterbodies with previously identified impairments that could not be readily mapped into the new system were listed as impairment cause unknown and/or source unknown. The 2006 Integrated Report's 303(d) List has 16 waterbodies (assessment units) where the available data and information was insufficient to identify a specific cause and, of these, 12 have source listed as unknown as well.

Additionally, the ARS files used to document water quality assessments were developed to specifically relate to how the ADB system catalogs impairment causes and sources. Because the new ADB system changed both the cause and source lists, as well as enforcing "cause-source" linkages, the existing ARS files needed modification. During the course of the 2006 reporting cycle all 1,102 ARS files were updated to new data recording requirements. From this set of files, 483 waterbody assessment units were updated using the program's water quality standards attainment assessment process.¹⁵ The remaining 619 ARS files

¹⁵ Montana Department of Environmental Quality (US) [DEQ]. Standard Operating Procedures Water Quality Assessment Process and Methods (formerly Appendix A to 303(d) 2000-2004) WQPBWQM-001.

had been previously assessed during the 2000, 2002, or 2004 reporting cycles and were only updated to link beneficial uses with impairment causes and sources. These 619 waterbody assessments will be more rigorously evaluated when those waterbody assessments are updated and before any TMDL decisions are made.

Data Management System: The Next Evolution

Beginning with the 2008 reporting cycle the DEQ Water Quality program will be using a newly developed integrated data management and assessment system. The DEQ developed the Water Quality Assessment, Reporting, and Documentation (WARD) System to integrate the EPA Assessment Database (v. 2.2) with new relational databases for the program's ARS files, and the bureau's library. This system eliminates redundant data entry; enforces new data entry standards for library citations; links data sources and data summaries; and enforces business validation rules where appropriate to reduce data entry errors and improve overall assessment quality assurance and quality control processes. Additionally, the WARD system provides greatly enhanced reporting functionality to assist in the development of the Integrated Report, and more importantly, provides cleaner and more easily interpreted water quality assessment reports for the public. These reports will be available via the program's newly enhanced public reporting web site, the Clean Water Act Information Center (CWAIC) available through the Montana State Library's Natural Resources Information Service at the following URL: www.cwaic.mt.gov.